



bridge, highway & rail engineering
entertainment engineering
subaqueous investigation
civil & site engineering
structural design
marine facilities
geotechnics
surveying
forensics

September 5, 2013

Stageline Mobile Stage Inc.
700 Marsolais Street
L'Assomption, Quebec, Canada, J5W 2G9

Email: Yvan@stageline.com

Attn: Mr. Yvan Miron

Re: SL260 New Generation Mobile Stage – Use in the United States
MEG File No. 120328

McLaren Engineering Group (MEG) has reviewed the SL260 New Generation Mobile Stage system for general use in the United States. **We believe that the erected system will safely support the approved loading and environmental conditions if properly assembled and used in accordance with manufacturer's recommendations and as noted herein.**

The assessment by MEG only considers the fully erected SL260 (New Gen.) Mobile Stage structure and its standard features, including wind walls, adjustable side sound hangers ("ECS"), and front-of-house rigging pipes. Additional items such as auxiliary components, P.A. side platforms, hydraulic systems and erection devices were not considered in this review. The fabrication, design and operational procedures meet or exceed the requirements of ANSI E1.21-2006 "Temporary Ground-Supported Overhead Structures Used to Cover the Stage Areas and Support Equipment in the Production of Outdoor Entertainment Events." The design loads were derived from ASCE 7 and ANSI E1.21. Steel design was performed using AISC-LRFD provisions. Plywood was designed using APA provisions.

The design and construction of the erected stage assembly meets the applicable requirements of IBC-2009 Chapter 16, with the following suitable adjustments:

1. The mobile stage is erected for a very short period of time and protective actions will be taken by trained personnel under specified environmental conditions. Environment loads in ASCE 7 and IBC, including wind, are based on statistical probabilities that relate to time. Reductions in design loads have been taken using the provisions of ANSI E1.21 to account for such conditions. The wind design loads for the mobile stage far exceed the minimum permissible using E1.21.
2. ANSI E1.21 allows reduced wind loads compared with IBC only if weather is monitored and if certain actions by trained personnel can be accomplished. The procedures in the User's Manual comply with and exceed the minimum requirements of E1.21.

Stageline Mobile Stage Inc. furnished the following material for review:

1. SL260 (New Gen.) Mobile Stage Design Brief, dated June 2012

Offices: New York, Maryland, Florida, Connecticut, California

Licensed in:

Alabama • Arizona • Arkansas • California • Colorado • Connecticut • Delaware • District of Columbia • Florida • Georgia • Hawaii • Idaho
Illinois • Indiana • Iowa • Kansas • Kentucky • Louisiana • Maine • Maryland • Massachusetts • Michigan • Minnesota • Mississippi • Missouri
Montana • Nebraska • Nevada • New Hampshire • New Jersey • New Mexico • New York • North Carolina • Ohio • Oklahoma • Oregon
Pennsylvania • Rhode Island • South Carolina • Tennessee • Texas • Utah • Vermont • Virginia • Washington • West Virginia • Wisconsin • Wyoming

McLaren Technical Services, inc.
100 Snake Hill Road
West Nyack, New York 10994
Phone (845) 353-6400
Fax (845) 353-6509
e-mail: mgmclaren@mgmclaren.com
On the web: www.mgmclaren.com

2. SL260 (New Gen.) User's Manual, dated June 2012
3. Matrix structural computer model analysis results using "Visual Design" software by Civil Design Inc.
4. SL260 (New Gen.) assembly drawings and select detail shop drawings
5. Stageline Mobile Stage Equipment "Wind Resistance and Procedures in Case of Heavy Wind," dated September 27, 2011

The SL260 Mobile Stage is to be used as a performance or similar platform for short-term temporary use in outdoor environments. The mobile stage travels as a tractor trailer; when it arrives on site, the Certified Operator and crew deploy and erect the stage roof and stage platform assembly. The trailer chassis remains in place as the center portion of the stage. The mobile stage bears on grade that is suitable to support the truck and tractor trailer. The Certified Operator in conjunction with the Event Producer, are responsible for confirming that the ground bearing conditions are suitable as per the User's Manual.

The mobile stage has a roof, available rigging points, and optional fabric wind walls. The stage is a temporary performance platform and not a legitimate theater stage, and as such, is not subject to the same live loads. The SL260 has a stage live load rating of 125 psf. The SL260 has a roof live load rating of 20 psf unrigged or 25,000 lbs rigged. The side sound hangers ("ECS") on the downstage corners have a maximum 2,500 lbs rigging capacity and the front-of-house rigging pipes have a maximum 350 lb and 750 lb capacity for the 8'-0" (2.44 m) and 4'-9" (1.45 m) long pipes respectively. The ECS and rigging pipe capacities are not in addition to roof rigging capacity, and loads at these elements are to be deducted from the overall 25,000 lb roof rigging capacity. Standard Stageline stairs and guardrails are appropriate for performance use. Netting must be added to the guardrails for events in which the general public will have access to the stage area.

The stage roof is intended to support rigging loads, wind, and rain. It is not generally intended to support the weight of snow and ice. Use in locations and time periods where snow and ice are a possibility shall be reviewed and approved in writing by a professional engineer for the combined effects of rigged loads, wind, snow, rain and/or ice.

Users must understand and carefully adhere to the Rigging Diagram provided in the User's Manual. If the desired rigging loads deviate from or exceed those specified on the Rigging Diagram, contact Stageline Mobile Stage Inc. for advice. No adjustments or modifications should be made to the SL260 without first being reviewed and approved by Stageline Mobile Stage Inc.

As stated in the SL260 User's Manual, the stage system must be operated under the supervision of Stageline trained and certified personnel.

The mobile stage assembly is designed to resist a 90 mph 3-second wind gust without the wind walls, and 60 mph 3-second wind gust with the wind walls in place. A Stageline Certified Operator is required to monitor wind forecasts from an official weather information service for the entire period the structure is assembled. Stageline recommends that the Operator use an anemometer to measure wind on site for improved real-time wind monitoring. The Certified Operator shall take recommended actions listed in the User's Manual and in the attached "Wind Resistance and Procedures in Case of Heavy Wind" document, if wind gusts approaching the applicable limit are possible or measured. Depending on the situation, such actions include lowering of the roof, if time permits, removal of vulnerable equipment, rapid mitigation of wind resistance from wind walls, and evacuation of personnel to a safe distance from the assembly.



Although not ordinarily required by governmental authorities for temporary structures, seismic loads have been considered for moderate and high seismic regions. The seismic loads do not govern the design. For SL260 Mobile Stage use in regions with seismic values in excess of high seismic regions (see Design Brief - Earthquake Section), lateral anchorage is needed to resist sliding and additional analysis will be required to determine mobile stage adequacy.

MGM acknowledges that the SL260 Mobile Stage is a piece of equipment that serves the live event industry and it is not practical to involve engineers in typical usage. As such, it is the responsibility of the Stageline Certified Operator to adhere to the manufacturer's guidelines. In addition, if the mobile stage is part of a larger event with other structures, it is the responsibility of the Event Producer to understand the requirements of the Stageline equipment, to understand the responsibilities of the Stageline Certified Operator, and coordinate the Stageline mobile stage requirements with the event operational management plan. It is the responsibility of the mobile stage Owner to comply with manufacturer's guidelines, including proper use, maintenance, and periodic inspections and testing. Such inspections include visual and functional testing of all hydraulic, structural and mechanical components, which must be conducted by qualified personnel once every year according to the manufacturer's guidelines. The inspection and testing reports must be properly filed along with the maintenance records of the mobile stage.

Please feel free to contact our office if you have any questions about our review.

Very truly yours,

The Office of
McLaren Technical Services, Inc.
d/b/a **McLaren Engineering Group**



Malcolm G. McLaren, P.E., SECB
President

MGM/ach/kml

Attachments: Stageline Procedures for Heavy Wind
State P.E. and S.E. seals

P:\Proj120\120328\3_Correspondence\Letters\Sent\Ltr03-SL-260 US- 2012-09-05.doc



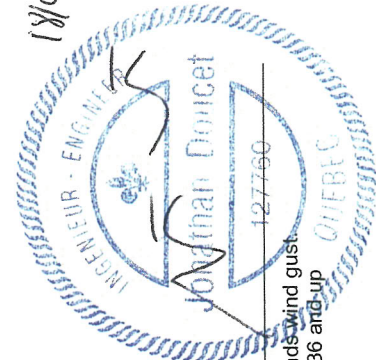
Certification

Stageline Mobile Stage Inc. Equipment

Wind Resistance and Procedures in case of Heavy Winds

We, from Stageline Mobile Stage inc., certify that the components identified below have been specified by the engineering department to meet the following wind resistance and also the NFPA 701-04 and ULC S-109 regulations (Standard Methods of Fire Tests for Flame Propagation of Textiles and Films).

MODEL	WIND Resistance 3S ¹	WIND Resistance (without windwalls) 3S ¹	WINDWALL AREA
SL50 ²	60 mph (97 km/h)	80 mph (129 km/h)	188ft ² (17.5 m ²)
SL100	60 mph (97 km/h)	80 mph (129 km/h)	679ft ² (63.1m ²)
SL200	60 mph (97 km/h)	90 mph (144 km/h)	490ft ² (45.5m ²) + 2 x 198ft ² (18.4m ²)
SL250	60 mph (97 km/h)	90 mph (144 km/h)	566ft ² (52.6m ²) + 2 x 243ft ² (22.6m ²)
SL260	60 mph (97 km/h)	90 mph (144 km/h)	599ft ² (55.6m ²) + 2 x 257ft ² (23.9m ²)
SL320	60 mph (97 km/h)	90 mph (144 km/h)	991ft ² (92.1m ²) + 2 x 600ft ² (55.7m ²)
PROMOBILE	60 mph (97 km/h)	90 mph (144 km/h)	594ft ² (55.2m ²) + 2 x 288ft ² (26.8m ²)
SAM440	60 mph (97 km/h)	90 mph (144 km/h)	1147ft ² (106.6m ²) + 2 x 731ft ² (67.9m ²)
SAM550	60 mph (97 km/h)	90 mph (144 km/h)	2 x 690ft ² (64.1m ²) + 2 x 747ft ² (69.4m ²)
SAM555	60 mph (97 km/h)	90 mph (144 km/h)	2 x 805ft ² (74.8m ²) + 2 x 793ft ² (73.7m ²)
Covered Wings SL250/260	50 mph (80 km/h)	90 mph (144 km/h)	632ft ² (58.7m ²) + 2 x 112ft ² (10.4m ²) per side
Covered Wings SAM555	50 mph (80 km/h)	90 mph (144 km/h)	2100ft ² (195.1m ²) + 275ft ² (25.5m ²) per side



¹ 3 seconds wind gust
² Unit #536 and-up

Procedures in case of Heavy Winds

Wind weather condition:

A) During set-up and dismantling of the stage and windwalls

The windwalls are the elements most at risk in windy conditions and the installation can become problematic. Wait until the wind has subsided before installing windwalls. If this is not possible, roll up windwalls and fasten with ratchet strap to the roof before raising the structure so it does not lash out and hurt anyone. We also suggest increasing your staff to have this operation completed quickly and more safely.

If wind speed exceeds 40 mph (65 km/h), windwalls and stage installation are not recommended. We strongly suggest you wait until wind diminishes before completing the set up or dismantling the stage and windwalls.

B) Prior to the start of the event

The Stagemobile Stages are designed to resist 3 seconds wind gust up to 90mph¹ (145 Km/h). However, this wind resistance depends on a proper installation of all support equipment and braces. In any weather conditions, the stage must be inspected by a certified technician and all its components must be secured.

1. If wind gusts are expected to exceed **50mph (80 km/h)** (40 mph if covered wings are installed):
 - a) Roof structure should be lowered to reduce exposed surface.
 - b) Windwalls should be removed. If not possible, roll up all access doors.
 - c) Remove, lower and secure all movable parts i.e. speakers, screens or lighting equipment, to limit any movement.

C) During the event

1. If wind gusts exceed **40mph (64 km/h)** (30 mph if covered wings are installed):
 - a) Roll up all access doors.
 - b) Remove, lower and secure all movable parts i.e. speakers, screens or lighting equipment, to limit any movement.
2. If wind gusts exceed **50mph (80 km/h)** (40 mph if covered wings are installed):
 - a) Unclasp the windwalls or slash openings in the windwalls.
 - b) The public and all non essential personnel present must remain at least 100 ft (30 m) away from the stage.
3. If wind gusts exceed **60 mph (97 km/h)** (50 mph if covered wings are installed):
 - a) All remaining personnel present must remain at least 100 ft (30 m) away from the stage.

Note: The most probable scenario during a violent storm is that the windwalls will be torn away. This is why it is so important to keep all technicians and the crowd at a safe distance.


Research & Engineering

18/03/13

¹ 80 mph (129 km/h) for an SL50*, SL100 or Mix position
* Unit # 536 and up



Certification

Stageline Mobile Stage Inc. Equipment

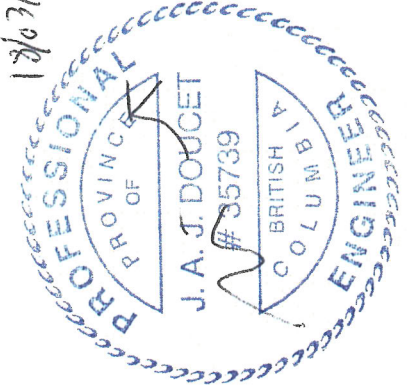
Stage and Covered Sound Wings Windwalls

We, from Stageline Mobile Stage inc., certify that the component identified above has been specified by the engineering department to meet NFPA 701-04 and ULC S-109 (Standard Methods of Fire Tests for Flame Propagation of Textiles and Films).

MODEL	WINDWALL AREA	MODEL	WINDWALL AREA
SL50	188ft ² (17.5 m ²)	PROMOBILE	594ft ² (55.2m ²) + 2 x 288ft ² (26.8m ²)
SL100	679ft ² (63.1m ²)	SAM440	1147ft ² (106.6m ²) + 2 x 731ft ² (67.9m ²)
SL200	490ft ² (45.5m ²) + 2 x 198ft ² (18.4m ²)	SAM550	2 x 690ft ² (64.1m ²) + 2 x 747ft ² (69.4m ²)
SL250	566ft ² (52.6m ²) + 2 x 243ft ² (22.6m ²)	SAM555	2 x 805ft ² (74.8m ²) + 2 x 793ft ² (73.7m ²)
SL260	599ft ² (55.6m ²) + 2 x 257ft ² (23.9m ²)	Covered Sound Wings SL-250/260	632ft ² (58.7m ²) + 2 x 112ft ² (10.4m ²) per side
SL320	991ft ² (92.1m ²) + 2 x 600ft ² (55.7m ²)	Covered Sound Wings SAM555	2100ft ² (195.1m ²) + 275ft ² (25.5m ²) per side



18/03/13



18/03/13



18/03/13



18/03/13

Research & Engineering

Procedures in case of Heavy Winds

Wind weather condition:

A) During set-up and dismantling of the stage and windwalls

The windwalls are the elements most at risk in windy conditions and the installation can become problematic. Wait until the wind has subsided before installing windwalls. If this is not possible, roll up windwalls and fasten with ratchet strap to the roof before raising the structure so it does not lash out and hurt anyone. We also suggest increasing your staff to have this operation completed quickly and more safely.

If wind speed exceeds 40 mph (65 km/h), windwalls and stage installation are not recommended. We strongly suggest you wait until wind diminishes before completing the set up or dismantling the stage and windwalls.

B) Prior to the start of the event

The Stagemobile Stages are designed to resist 3 seconds wind gust up to 90mph¹ (145 Km/h). However, this wind resistance depends on a proper installation of all support equipment and braces. In any weather conditions, the stage must be inspected by a certified technician and all its components must be secured.

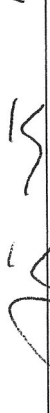
1. If wind gusts are expected to exceed **50mph (80 km/h)** (40 mph if covered wings are installed):
 - a) Roof structure should be lowered to reduce exposed surface.
 - b) Windwalls should be removed. If not possible, roll up all access doors.
 - c) Remove, lower and secure all movable parts i.e. speakers, screens or lighting equipment, to limit any movement.

C) During the event

1. If wind gusts exceed **40mph (64 km/h)** (30 mph if covered wings are installed):
 - a) Roll up all access doors.
 - b) Remove, lower and secure all movable parts i.e. speakers, screens or lighting equipment, to limit any movement.
2. If wind gusts exceed **50mph (80 km/h)** (40 mph if covered wings are installed):
 - a) Unclasp the windwalls or slash openings in the windwalls.
 - b) The public and all non essential personnel present must remain at least 100 ft (30 m) away from the stage.
3. If wind gusts exceed **60 mph (97 km/h)** (50 mph if covered wings are installed):
 - a) All remaining personnel present must remain at least 100 ft (30 m) away from the stage.

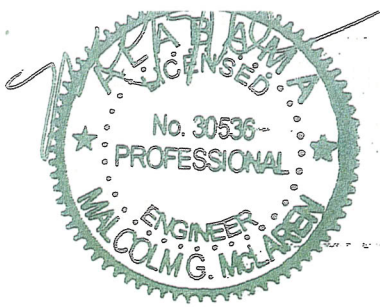
Note: The most probable scenario during a violent storm is that the windwalls will be torn away. This is why it is so important to keep all technicians and the crowd at a safe distance.

18/03/13



Research & Engineering

¹ 80 mph (129 km/h) for an SL50*, SL100 or Mix position
* Unit # 536 and up



Alabama PE #30536



Arizona PE # 44656



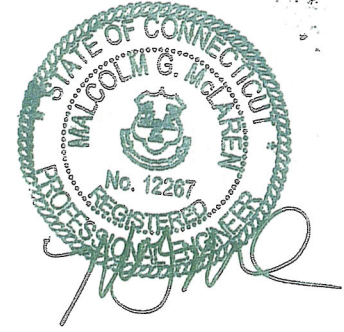
Arkansas PE #9849



California PE #C34109

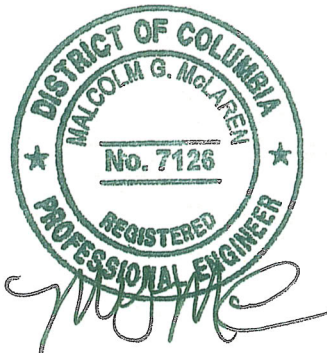


Colorado PE #30481



Connecticut PE #12267

Delaware PE #10093



D.C. PE #7126



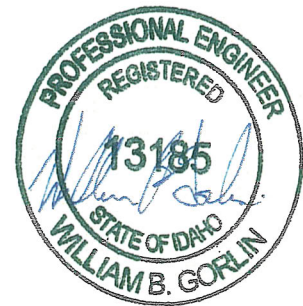
CIA # 7992
Florida PE #33033
Special Inspector PE #372



Georgia PE #14239



Hawaii PE # 13502



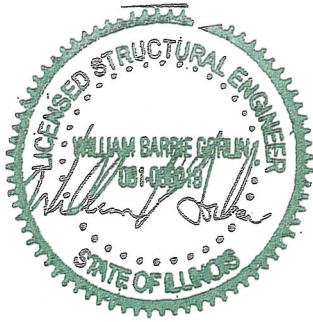
Idaho PE #13185

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Signature

Expiration Date of the License

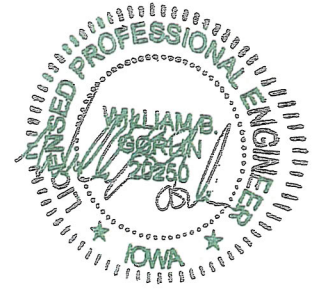
04/30/2014



Illinois SE #081-006019



Indiana PE #60900241



Iowa PE # 20250



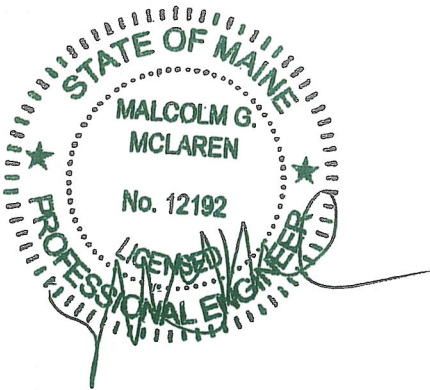
Kansas PE # 203393



Kentucky PE #13871



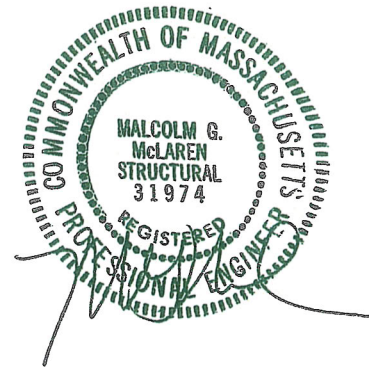
Louisiana PE #29960



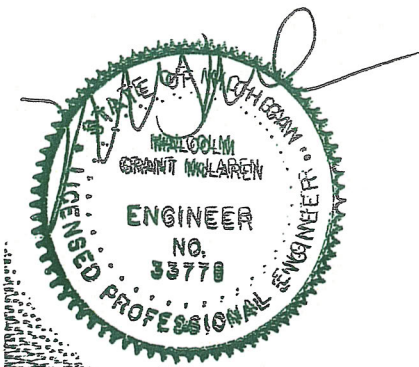
Maine PE# 12192



Maryland PE #10663



Massachusetts PE #31974



Michigan PE#6201033778

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.

[Signature]
Date 09/05/13 Registration No. 25312

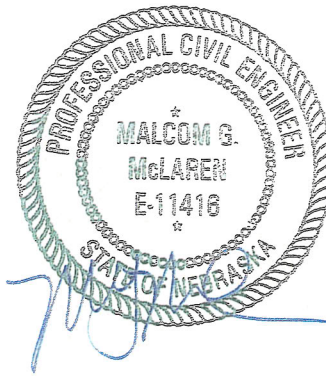
Minnesota PE #25312



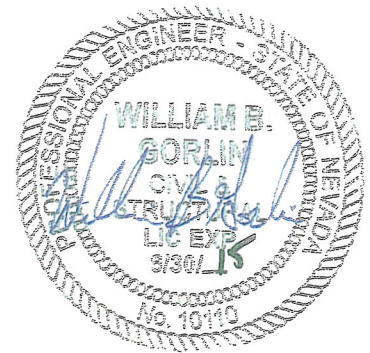
Mississippi PE #12055



Missouri PE #E-23163



Nebraska PE # E-11416



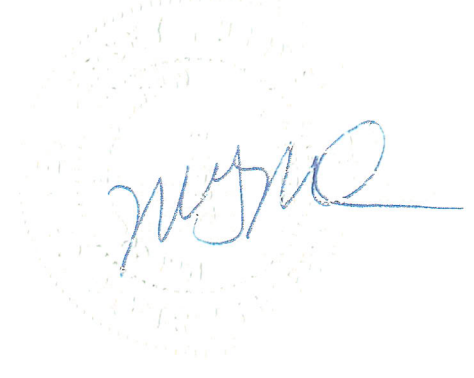
Nevada SE #10110



New Hampshire PE #4392



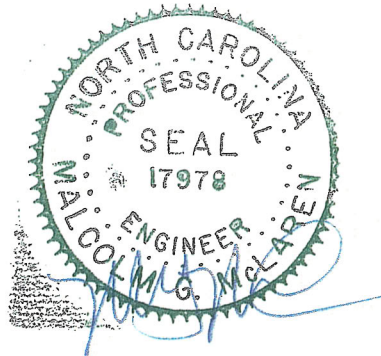
New Mexico PE #19886



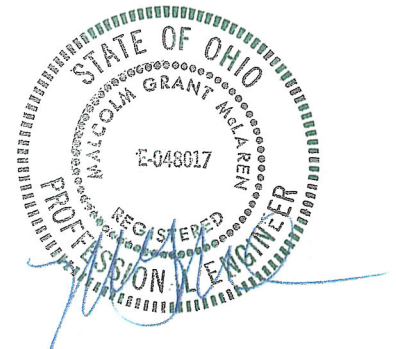
New Jersey PE #26476



New York PE #56880-1



North Carolina PE #17978



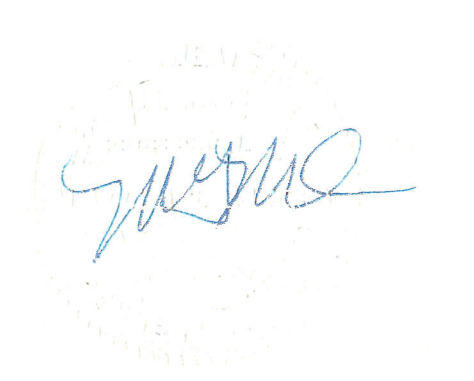
Ohio PE #E-048017



Oklahoma PE #20741



Oregon PE# 12000



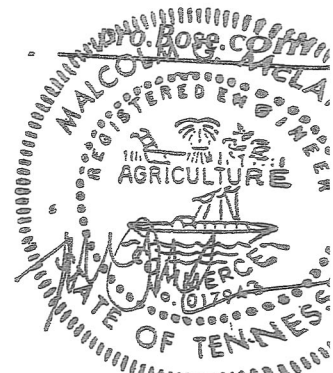
Pennsylvania PE #37653



Rhode Island PE #8774



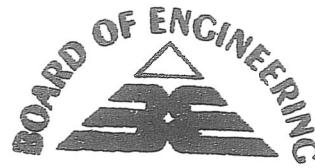
South Carolina PE #16783



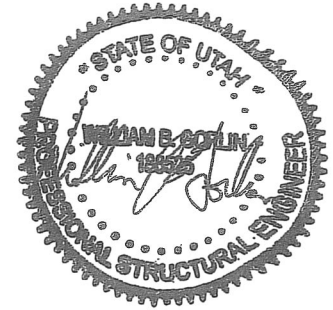
Tennessee PE #17943



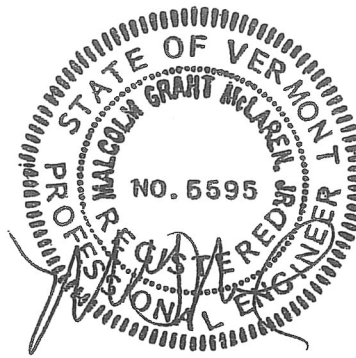
Texas PE #64236



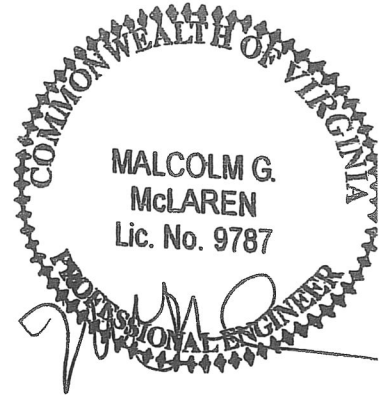
Trinidad & Tobago PE # 1072 E



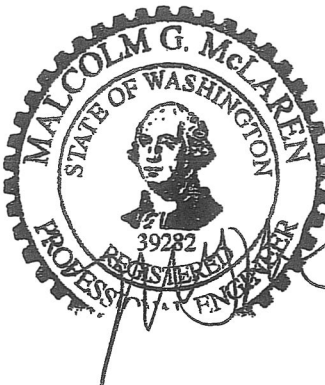
Utah SE #188525



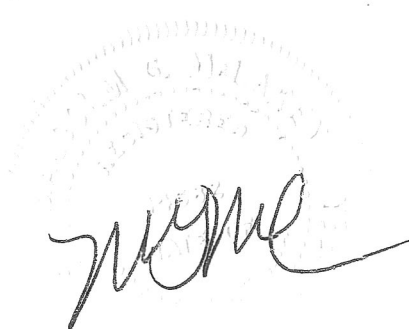
Vermont PE #18-0005595



Virginia PE #9787



Washington PE #39282



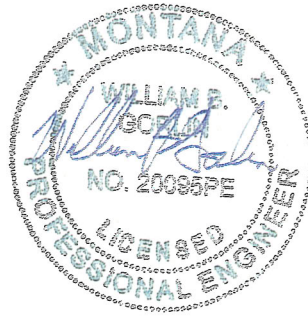
West Virginia PE #14682



Wisconsin PE #34077-006



Wyoming PE # 12607



Montana PE # 20095